

Innovative ideas offer better hospital food service, new equipment for food processing efficiency and improved nutrition for the elderly.

thought for food

If you have ever been hospitalized, you are probably aware of a problem that has long troubled the staffs of most large medical institutions.

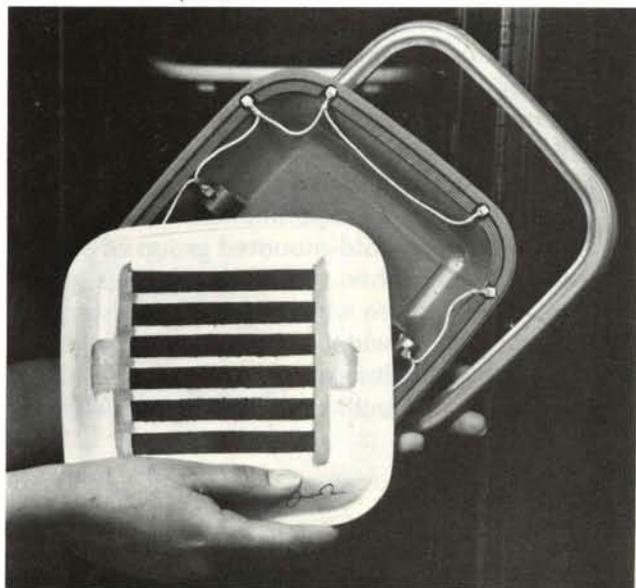
"Tired food," it is called. Food gets tired when there is too long a lapse between preparation and delivery to the patient. That happens often in hospitals which must serve a thousand or more meals daily, because food must be cooked well in advance, stored hot until mealtime, then moved to nursing units some distance from a central kitchen. In this lengthy process, the meal loses heat and moisture, looks unappetizing and, most important, its nutritional value is diminished.

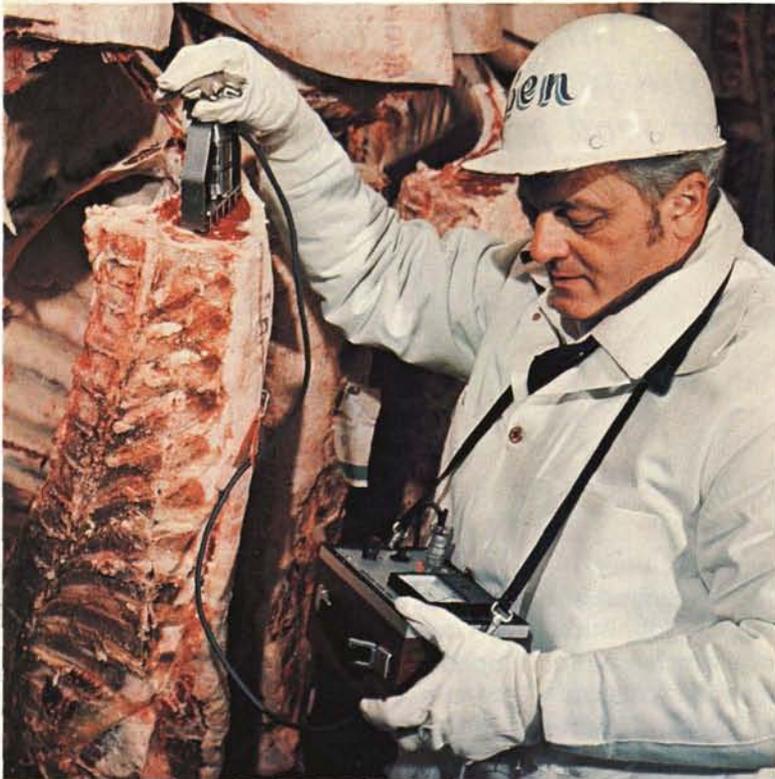
Food no longer need suffer fatigue, thanks to a space spinoff called the integral heating system. Developed and produced by 3M Co., St. Paul, Minn., the system features an entirely new concept of electronic food warming—no gas flame, no electric rods, no thermostats, no radiation. Now in use at more than 40 U.S. hospitals and nursing homes, it provides a means of serving piping-hot meals with better color and taste retention, no burning or drying out, and no loss of nutrition. Integral heating appears slated for wider acceptance because in solving a nagging problem it also pays dividends in reduced labor costs, less waste, and electricity savings of as much as 60 percent.

Key to the integral heating system's efficiency is the "dish-oven," which doubles as a heating unit and serving plate. The dish-oven consists of a sealing frame (top) a plastic outer shell (center) and the ceramic inner dish. A special coating on the bottom of the inner dish (dark areas) transforms electrical impulses into heat.

Integrated heating traces its lineage to a similar but less sophisticated 3M design intended for airline use, which was redeveloped as a food-service unit for manned spacecraft. The basic commercial design was refined and improved to NASA specifications, including addition of miniaturized control circuitry and energy-conservation features to meet the reliability and energy-efficiency requirements of manned spacecraft.

Components of the integral heating system include a unique dish that serves as both plate and oven, and a roll-around control module that provides the heat source. Metal buttons on the shell of the dish-oven make electrical contact when they slide into the control module on conductor rails. A resistive coating on the bottom of the dish-oven converts electrical energy to heat. The device uses less electricity because the heat goes directly to the food; it is not wasted by heating oven walls and surrounding air. Efficiency of the integral heating





An Armour technician checks meat to see how tender it will be after cooking. Called the Tenderometer, the testing device is a spinoff from a gage originally developed for the Surveyor lunar lander.

system is ninety percent or more—as compared to a range of thirty to fifty percent in conventional equipment.

Tenderness Tester

Space telemetry has been transferred to food processing in the Armour Tenderometer, an instrument that predicts the tenderness of meat. The space component of the instrument is a sensitive, highly reliable strain gage originally produced for NASA's Surveyor lunar lander and other space programs by BLH Electronics, Waltham, Mass.

Several years ago Armour & Co. began to develop a method of testing a hanging carcass to predict how tender the meat would be after cooking; no such method then existed.

After considerable experimentation, Armour came up with a manifold-mounted group of needle-like probes, which when stuck into a carcass, could measure the degree to which the meat resisted penetration. This provided a basis for predicting tenderness, but the development required one more step; a device that could translate meat resistance

into an electrical readout. Armour found it in the BLH strain gage.

The resulting Tenderometer, now a standard and important part of Armour's meat processing operation, includes a large, 10-pronged fork which is plunged into a carcass and a cable-connected, hand-held electronic device that translates the sensings of the prongs into a tenderness reading on a dial. The instrument is used by Armour to select and guarantee a premium line of beef known as TesTender, whose annual sales run into tens of millions of pounds.

Space Technology for Tuna Boats

The Saturn V booster burns ultra-cold liquefied hydrogen fuel, which must be protected from the intense heat of the launch vehicle's mighty rocket engines. This necessitated development of superefficient insulation to keep the fuel tanks cold. One of two methods used was a spray-on polyurethane foam technique devised by Rockwell International Corp. The technique now has found commercial application as insulation for tuna boats.

Freshly-caught tuna is stored below decks in wells cooled to about zero degrees by brine circulated through a refrigerating system. The wells formerly were insulated by cork or fiberglass, but both

